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The European Commission Takes Radio Regulations Even More Serious

Josef Preishuber-Pflügl
Rapporteur ETSI EN 302 208
CTO CISC Semiconductor GmbH

9 December 2020

20+ years in standardization

Josef Preishuber-Pflügl

Convener ISO/IEC JTC1 SC31 **WG4** – Radio communications (RFID, RTLS, Security)

prior Project Editor **ISO/IEC 18000-63** - UHF RFID

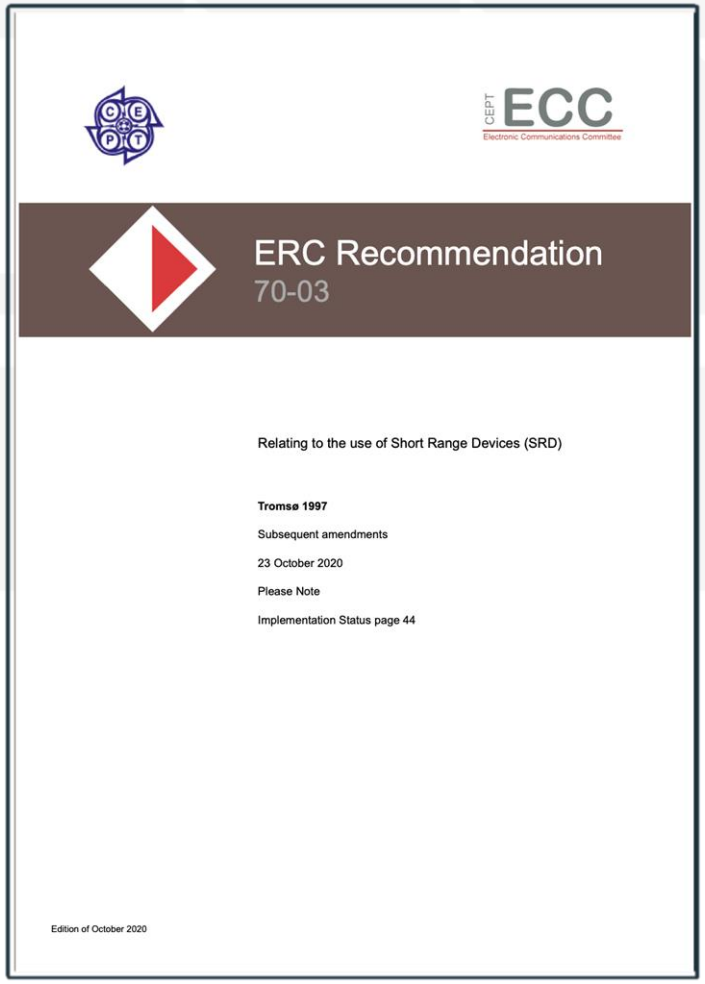
Vice-Chairman **ETSI** ERM **TG34** RFID

Rapporteur ETSI **EN 302 208** UHF RFID

Chairman RAIN RFID **TWG** (Technical Work Group)

Sources: etsi.org, wikipedia.org, europe.eu

The documents


CEPT ECC
Electronic Communications Committee

ERC Recommendation
70-03

Relating to the use of Short Range Devices (SRD)

Tromsø 1997

Subsequent amendments

23 October 2020

Please Note

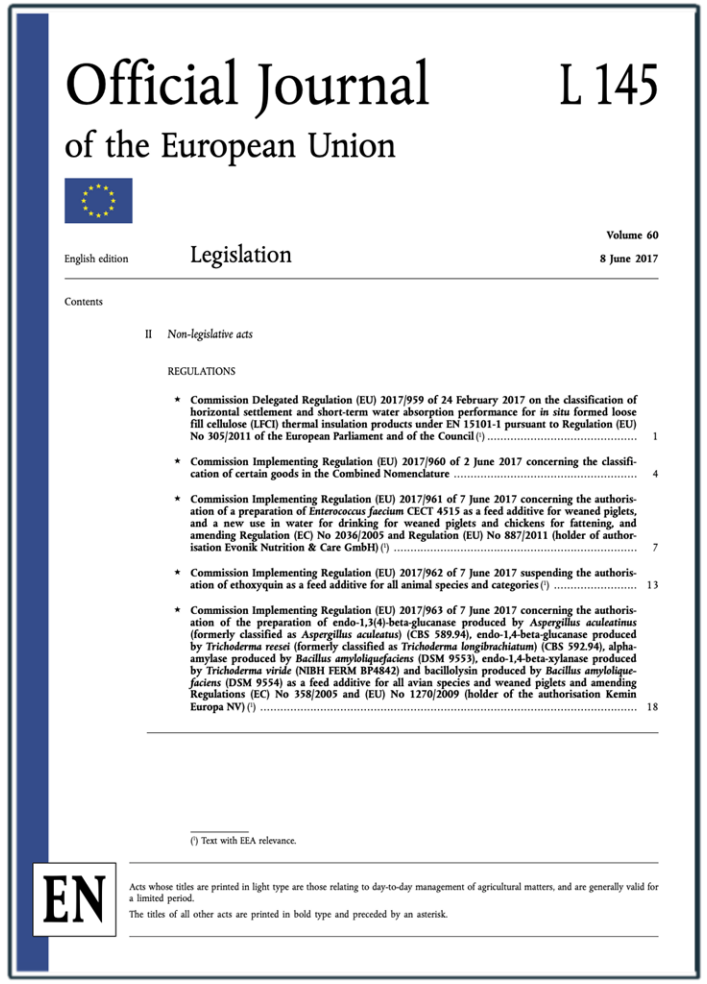
Implementation Status page 44

Edition of October 2020


ETSI EN 302 208 V3.3.1 (2020-08)

HARMONISED EUROPEAN STANDARD

Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard for access to radio spectrum


Official Journal of the European Union

L 145

English edition — Legislation — Volume 60 — 8 June 2017

Contents

II *Non-legislative acts*

REGULATIONS

* **Commission Delegated Regulation (EU) 2017/959 of 24 February 2017 on the classification of horizontal settlement and short-term water absorption performance for *in situ* formed loose fill cellulose (LFCI) thermal insulation products under EN 15101-1 pursuant to Regulation (EU) No 305/2011 of the European Parliament and of the Council** (1) 1

* **Commission Implementing Regulation (EU) 2017/960 of 2 June 2017 concerning the classification of certain goods in the Combined Nomenclature** 4

* **Commission Implementing Regulation (EU) 2017/961 of 7 June 2017 concerning the authorisation of a preparation of *Enterococcus faecium* CECT 4515 as a feed additive for weaned piglets, and a new use in water for drinking for weaned piglets and chickens for fattening, and amending Regulation (EC) No 2036/2005 and Regulation (EU) No 887/2011 (holder of authorisation Evonik Nutrition & Care GmbH)** (1) 7

* **Commission Implementing Regulation (EU) 2017/962 of 7 June 2017 suspending the authorisation of ethoxyquin as a feed additive for all animal species and categories** (1) 13

* **Commission Implementing Regulation (EU) 2017/963 of 7 June 2017 concerning the authorisation of the preparation of endo-1,3(4)-beta-glucanase produced by *Aspergillus aculeatinus* (formerly classified as *Aspergillus aculeatus*) (CBS 589.94), endo-1,4-beta-glucanase produced by *Trichoderma reesei* (formerly classified as *Trichoderma longibrachiatum*) (CBS 592.94), alpha-amylase produced by *Bacillus amyloliquefaciens* (DSM 9553), endo-1,4-beta-xylanase produced by *Trichoderma viride* (NIBH FERM BP4842) and bacillolysin produced by *Bacillus amyloliquefaciens* (DSM 9554) as a feed additive for all avian species and weaned piglets and amending Regulations (EC) No 358/2005 and (EU) No 1270/2009 (holder of the authorisation Kemin Europa NV)** (1) 18

(1) Text with EEA relevance.

EN

Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

Source: cept.org, etsi.org, europa.eu

CEPT REC 70-03

- UHF RFID 865-868 MHz band
  - 4 Channels
  - 2 Werp transmit power
  - 200 kHz transmit channels
- UHF RFID 915-921 MHz band
  - 4 Channels
  - 4 Werp transmit power
  - 400 kHz transmit channels
  - Some countries have limitations in channel use
  - Some countries do not provide any channel
    - Germany DE
    - The Netherlands LU

DOUBLE IT

EN 302 208

- V3.1.1 is currently published and stated in the EU OJ 2017-06-08
- V3.3.1 has been developed to address the topic of measurement uncertainty
  - ❖Measurement uncertainty became less important
  - ❖EC set a new focus on efficient spectrum use
  - ❖Several updates
- Required for RED approval

Reader – Relaxed spurios emmissions

- All spectrum down to 694 MHz the limit is –36 dBm

Table 2: Spurious emission limits in e.r.p. (according to [i.16])

State	87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 694 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operating	4 nW (-54 dBm)	250 nW (-36 dBm)	1 µW (-30 dBm)
Standby	2 nW (-57 dBm)	2 nW (-57 dBm)	20 nW (-47 dBm)

Source: www.etsi.org/deliver/etsi_en/302200_302299/302208/03.03.01_60/en_302208v030301p.pdf

Focus on receiver tests

- Adjacent channel selectivity
- Blocking or desensitization
- Spurious emissions

- Receiver spurious response rejection
- Receiver sensitivity
- Receiver radio-frequency intermodulation

Reader receiver sensitivity

- Limits receiver sensitivity
- Setup

Table 2a: Receiver sensitivity limits

Category	Limit
Category I (> 30 dBm e.r.p.)	-60 dBm
Category II (> 13 to 30 dBm e.r.p.)	-55 dBm
Category III (≤ 13 dBm e.r.p.)	-45 dBm

Figure 15b: Conducted test set up for receiver sensitivity with (emulated) tag with variable backscatter

NOTE: For testing of ISO/IEC 18000-63 [i.20] compliant products it is recommended to use the protocol settings details as described for the ISO/IEC 18046-2 [i.17] reader sensitivity test. Values like Tari, RTcal, TRcal, BLF, DR and M should be recorded.

Source: www.etsi.org/deliver/etsi_en/302200_302299/302208/03.03.01_60/en_302208v030301p.pdf

Tag radiated power

- Reduction of ambiquities in tag radiated power (backscatter power)
- At tag position
  - 865 MHz band: -20 dBm
  - 915 MHz band: -10 dBm
- Tag for reader sensitivity: Both sidebands considered
- Tag as spectrum occupant: Single sideband considered

➔ **3 dB advantage**

On-metal tags

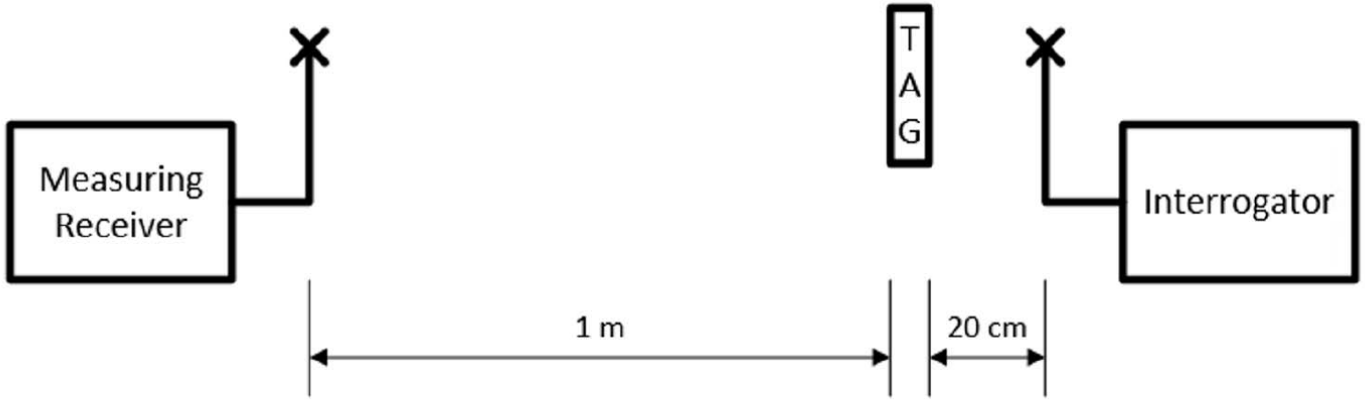
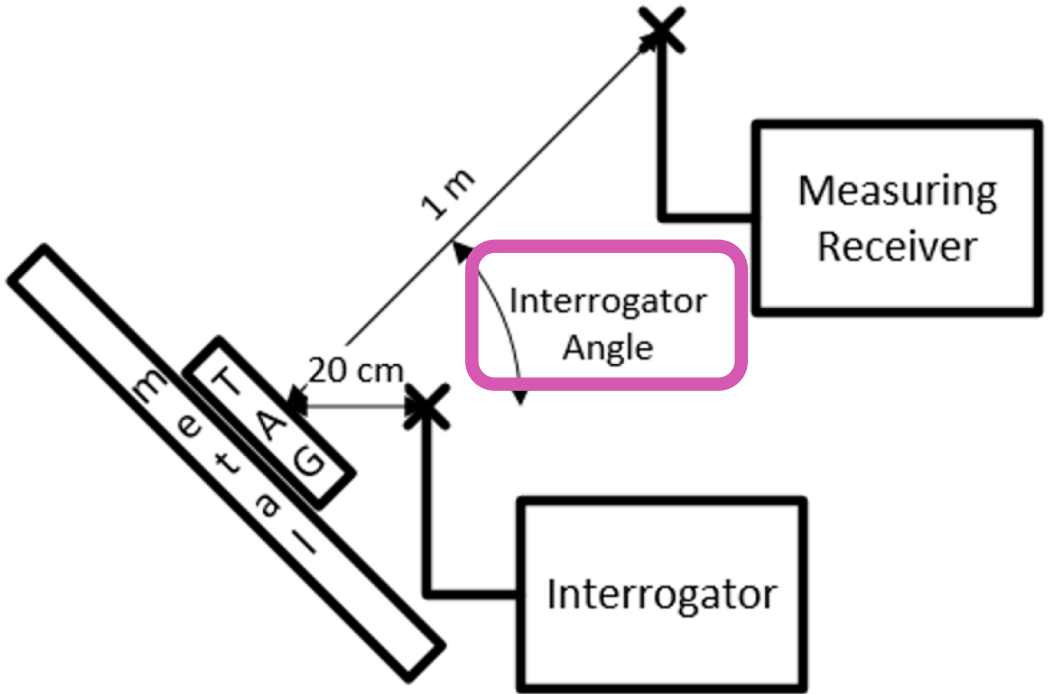
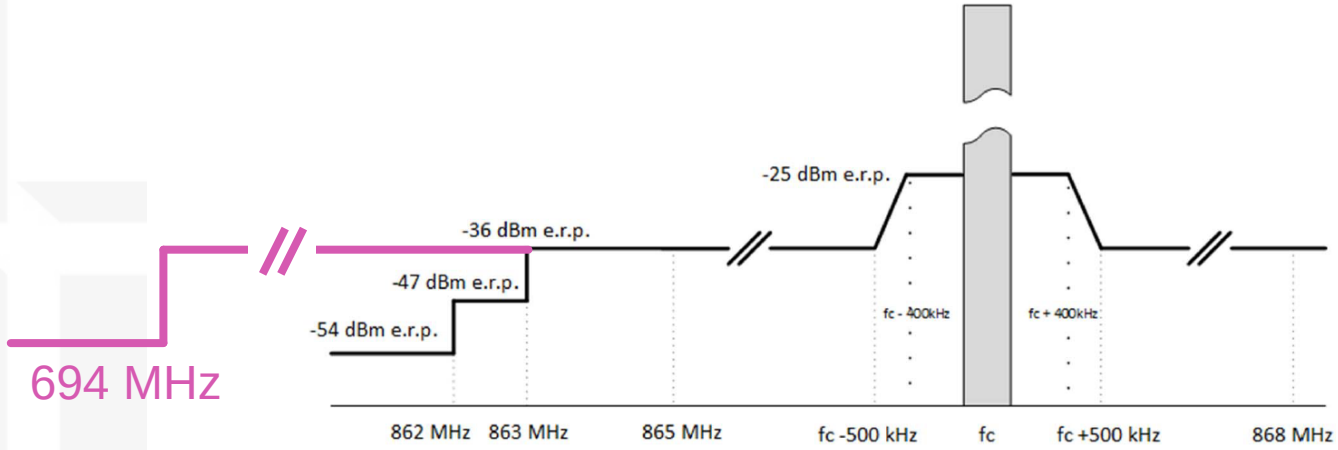


Figure 16: Measurement of tag emissions



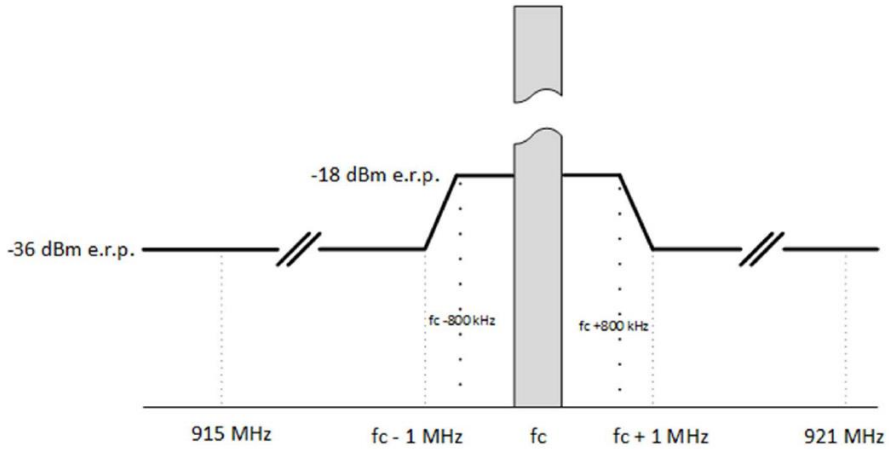
Source: www.etsi.org/deliver/etsi_en/302200_302299/302208/03.03.01_60/en_302208v030301p.pdf

Tag spurious emmisions



NOTE 1: fc is the centre frequency of the carrier transmitted by the interrogator.
NOTE 2: The transmit channel occupied by the interrogator is shown in grey.
NOTE 3: All power levels in the unwanted domain relate to the resolution bandwidths in figure 10.

Figure 8: Spectrum mask for tag for the lower band



NOTE 1: fc is the centre frequency of the carrier transmitted by the interrogator.
NOTE 2: The transmit channel occupied by the interrogator is shown in grey.
NOTE 3: All power levels in the unwanted domain relate to the resolution bandwidths in figure 11.

Figure 9: Spectrum mask for tag for the upper band

Source: www.etsi.org/deliver/etsi_en/302200_302299/302208/03.03.01_60/en_302208v030301p.pdf

ISO – ETSI aligned

ISO/IEC 18046-2:2020

Information technology — Radio frequency identification device performance test methods — Part 2: Test methods for interrogator performance

ABSTRACT

This document defi
requirements and te
application. The sun

GENERAL IN

Status : Publishe

Edition : 2

ISO/IEC 18046-3:2020

Information technology — Radio frequency identification device performance test methods — Part 3: Test methods for tag performance

ABSTRACT

This document defines test methods for performance characteristics of RFID tags for item management and specifies the general requirements and test requirements for tags which are applicable to the selection of devices for an application. The summary of the test reports forms a unified tag datasheet.

GENERAL INFORMATION

Status : Published	**Publication date :** 2020-10
Edition : 3	**Number of pages :** 51

Source: iso.org

The Value

- Standards define the globally reproducible test methods
- Traceable
- Globally reproducible
- Test equipment independent
- Meaningful in terms of physics
- Relevant to correlate test result with application performance

One method for each topic

- Aligned across global recognized standards from standards organizations
- International test standards for RAIN air interface (ISO/IEC 18000-63, GS1 EPC Gen2)
  - ISO/IEC 18046-2
  - ISO/IEC 18046-3
- Utilization for European standards
  - EN 302 208

ISO/IEC 18046-2
Receiver sensitivity measurement

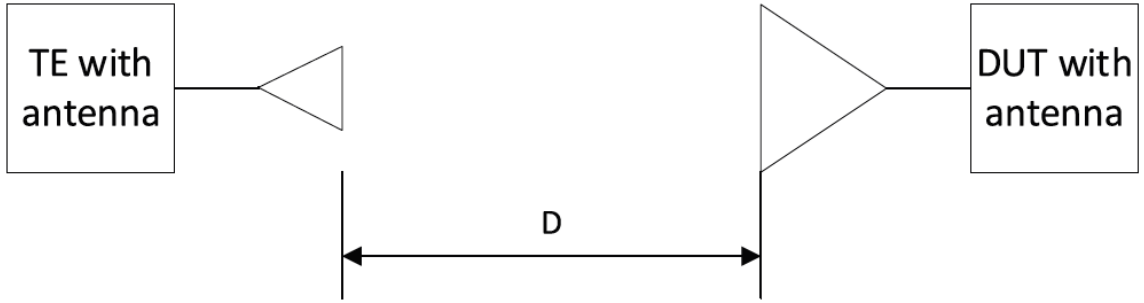


Figure 3 — Contactless test setup

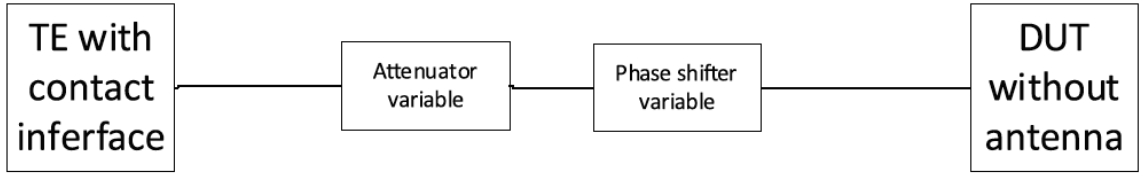
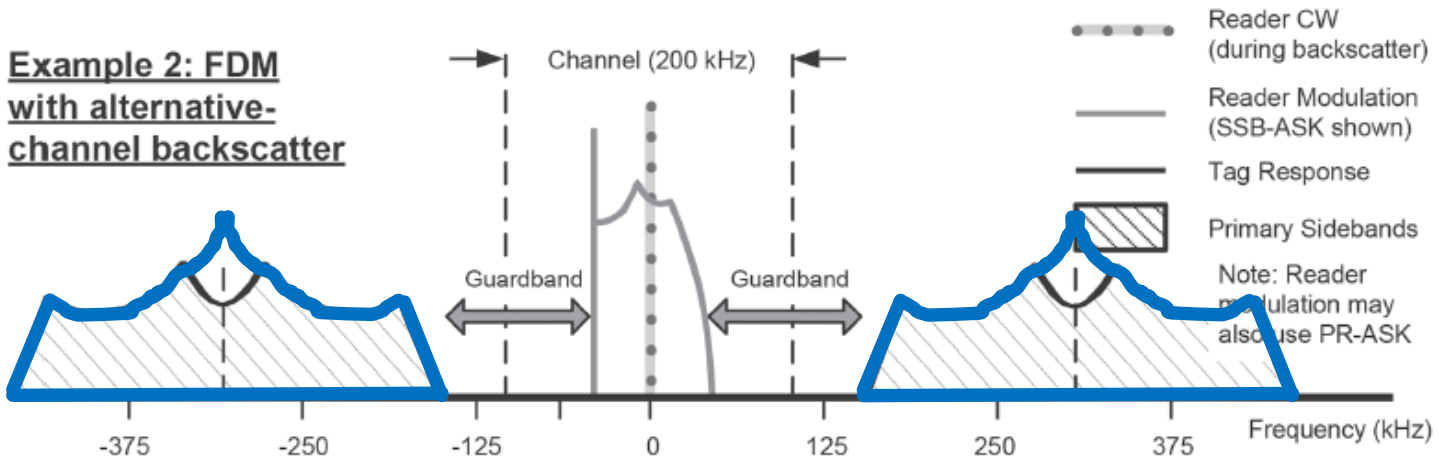


Figure 4 — Contact test setup

Source: iso.org

Backscatter power measurement

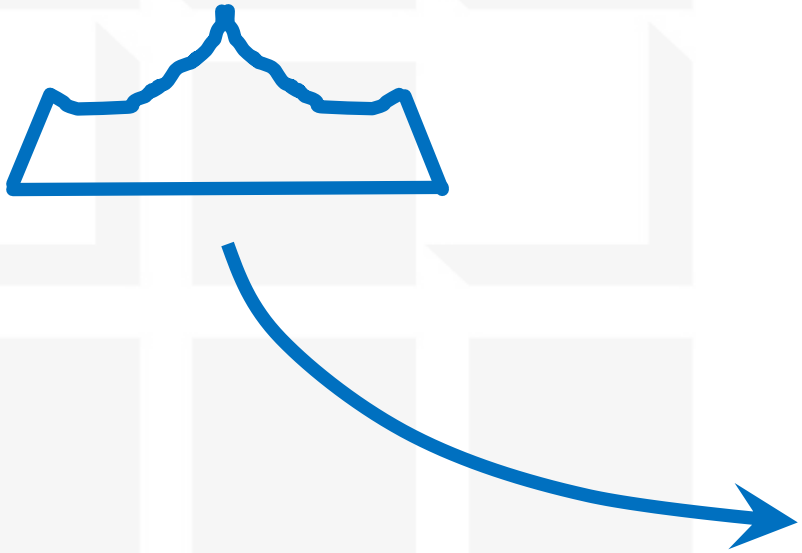


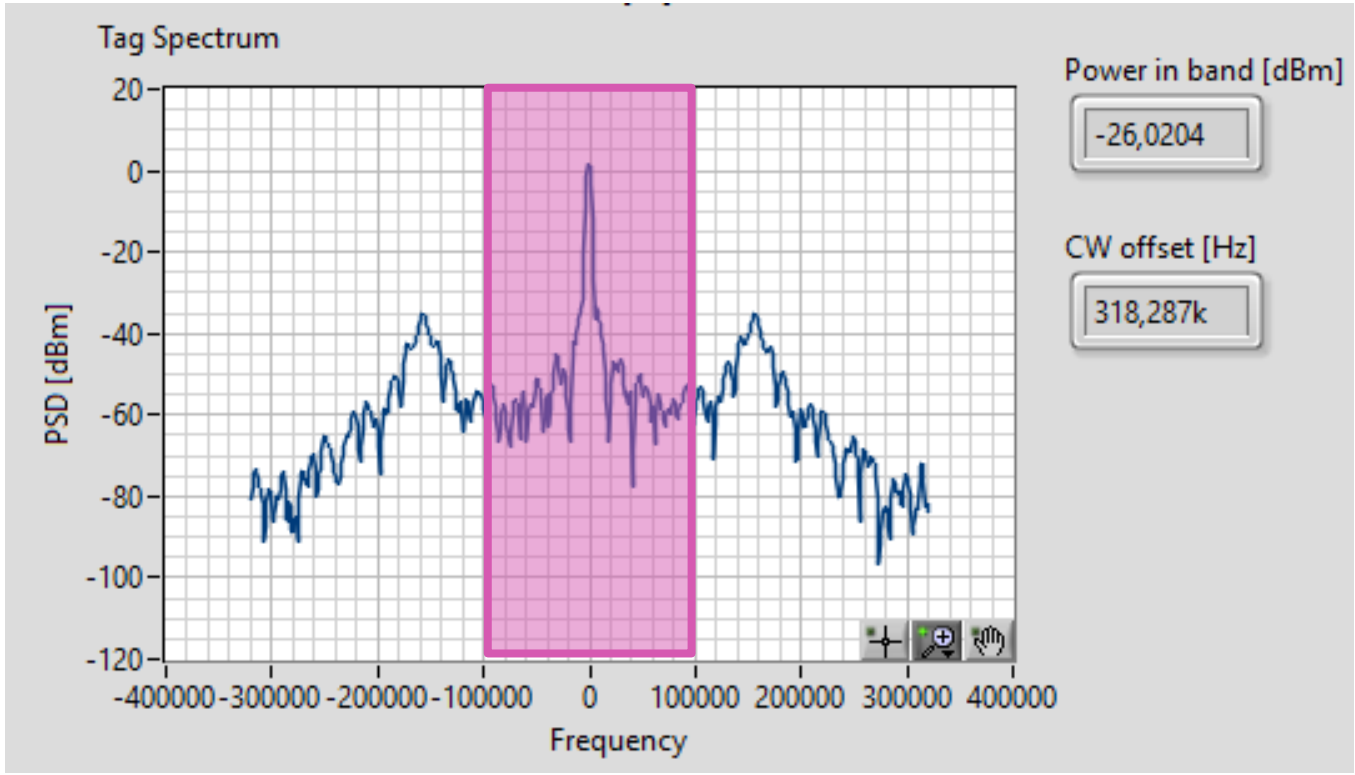
Tag Signal for reader

These values have been obtained by applying a guard band around the carrier to exclude the carrier including its phase noise. […]
Contribution of the tag harmonics to the measured backscatter is negligible.

Source: www.gs1.org/standards/epc-rfid/uhf-air-interface-protocol

Backscatter power measurement





Source: www.cisc.at/xplorer

- ISO/IEC 18046-2 – Annex A
- ISO/IEC 18046-3 – Annex E

Conclusions

- More reader tests for Europe
- More test options for tags
- 915 MHz band is in good shape except in the center
  - ❖Better performance
  - ❖Easier for tags
- Globally aligned tests allow use for multiple purposes

Questions?

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Presentations will be available on-line soon. You will receive an email with a link when they are available.